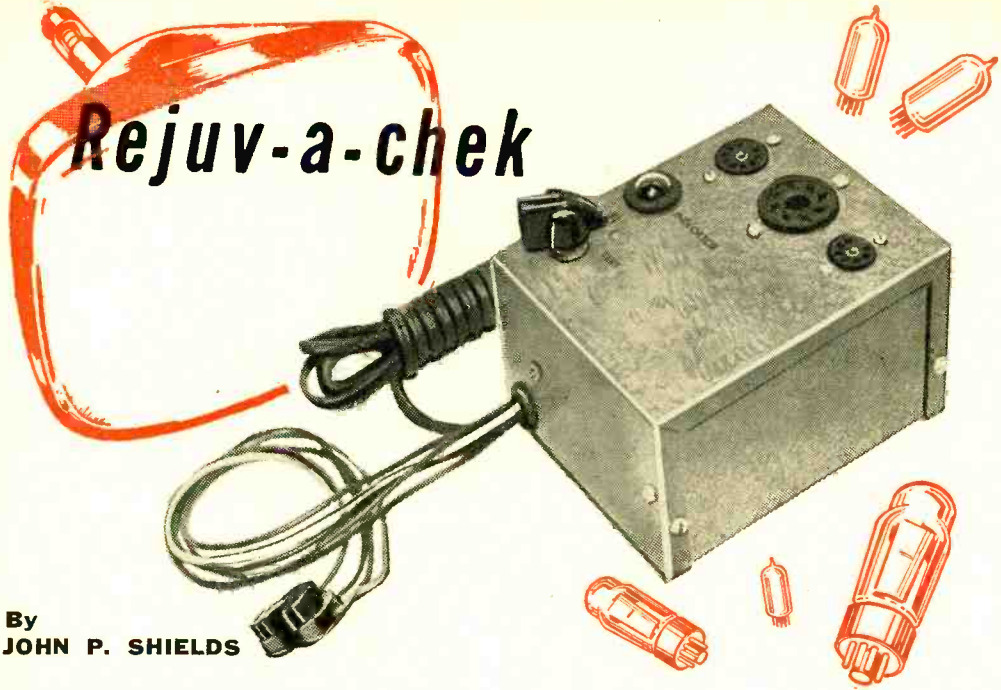
Rejuv-a-chek



By
JOHN P. SHIELDS

Test and rejuvenate your radio and TV tubes with this easily built device

THE "REJUV-A-CHEK" is a device designed to restore many hours of useful life to weak TV picture tubes and to other radio tubes. It is also a rapid tester of tube heaters, resistors, coils, pilot bulbs, and household appliances for continuity or burn outs.

Simply constructed and easy to build, this useful instrument can be duplicated for $8.00 or less, even without resort to your junk box.

Construction. Mount the tube sockets, switch, and a ⅜" rubber grommet—which holds bulb *NE1* in position—on the 4" x 5" top of the box. Then mount the filament transformer and the two-terminal tie strip on one end of the box. Also drill a ⅜" hole in this end and insert the other grommet. It will pass the power cord and the connections to the TV picture tube socket.

Wiring consists of connecting one heater terminal of each tube socket to the same red lead of the filament transformer and to *R1*. The other heater terminals of the sockets are similarly connected together and to one end of *R2, R3, R4* and *R5*. One black transformer lead and one side of the 117-volt power cord are also connected to the above junction.

Although there are five wires in the cable from the TV tube socket, only the black and brown wires are used in this circuit. The other three may be cut off short, taped up and pushed into a corner.

Turn switch *S1* to the limit of its rotation in one direction. It is now in the *Test* position. Leave this fixed contact connection blank. Connect *R5* to the next one (*C*), *R4* to contact *B*, and *R2-R3* to contact *A*. Connect the remaining red transformer lead to the rotor terminal of *S1*.

Using the Rejuv-a-chek. Turn the switch to *Test*, insert the power plug into a 117-volt receptacle, and plug a tube into the appropriate socket. If the tube heater is intact, bulb *NE1* will immediately glow.

HOW IT WORKS

In everyday use, the oxide coating of receiving tubes is gradually replaced by a layer of inert oxide "ash." As a result, cathode emission slowly decreases until it becomes insufficient for proper operation of the tube. In TV picture tubes this shows up as a dim picture with poor contrast, in others as low output, fuzzy quality, or loss of gain.

By operating the tube heater at approximately 30% above its rated voltage for about 10 minutes, with no connections to the other elements, this layer of dead ash may often be burned away to uncover a fresh layer of active oxide, thereby giving the tube new life. Of course, rejuvenation is only possible in tubes that have a reserve of cathode oxide to be uncovered and that do not have other defects.

The low current requirements of the neon indicator and the high value of dropping resistor *R1* limit the maximum current that may flow to less than 2 ma., making it possible to test even fairly high resistance components for continuity.

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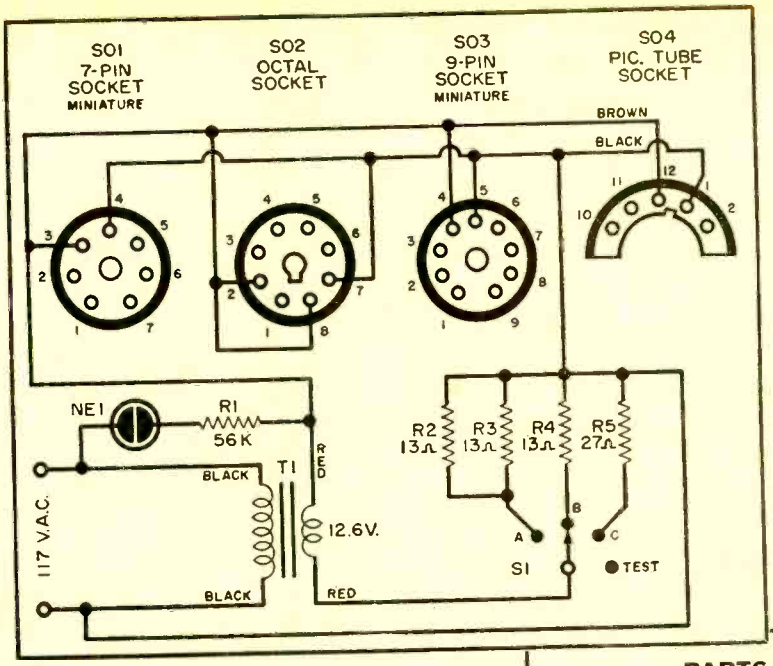


Simplicity of circuit is shown in diagram at left. Pictorial wiring diagram appears on p. 54. Although the transformer has a 12-volt output, the circuit tests 6.3-volt tubes. Footnote on next page tells how to vary circuit for other tubes. Photo at bottom of this page shows location of parts under the chassis box.

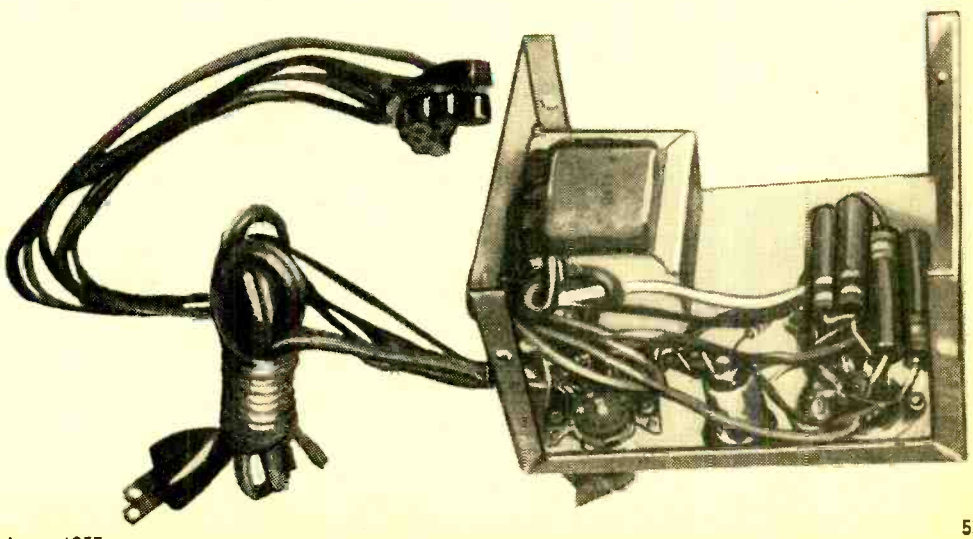
If *NE1* does not glow, the tube is burned out.

Assuming that *NE1* does glow, turn the switch to position *A*, *B* or *C*, selected as described below, and allow the tube to "cook" for about 10 minutes. Then test the tube in a tube tester or in the equipment from which it was removed. If it is weak, repeat the rejuvenation process once or twice. If it still does not respond, the tube is too far gone to be salvaged.

It's not necessary to remove a picture tube from a television receiver to apply the rejuvenation process. Simply pull the TV receiver plug from the 117-volt recep-

PARTS LIST

NE1—NE-16 neon bulb
R1—56,000-ohm, ½-watt resistor
R2, R3—13-ohm, 2-watt resistor (a single 6.5-ohm, 3 to 5 watt resistor may be substituted)
R4—13-ohm, 2-watt resistor
R5—27-ohm, 2-watt resistor
S1—5-position rotary switch (Mallory 3215J or equivalent)—use 4 positions
SO1—7-pin miniature tube socket
SO2—Octal tube socket
SO3—9-pin miniature tube socket
SO4—Picture-tube socket with leads
T1—12.6-volt filament transformer (Stancor P-8130 or equivalent)
1—3" x 4" x 5" aluminum box (Bud CU-2105 Minibox or equivalent)
1—Line cord with plug
1—2-terminal tie point
2—3/8" rubber grommets
Misc. hookup wire, 6-32 machine screws and nuts, decal transfer letters



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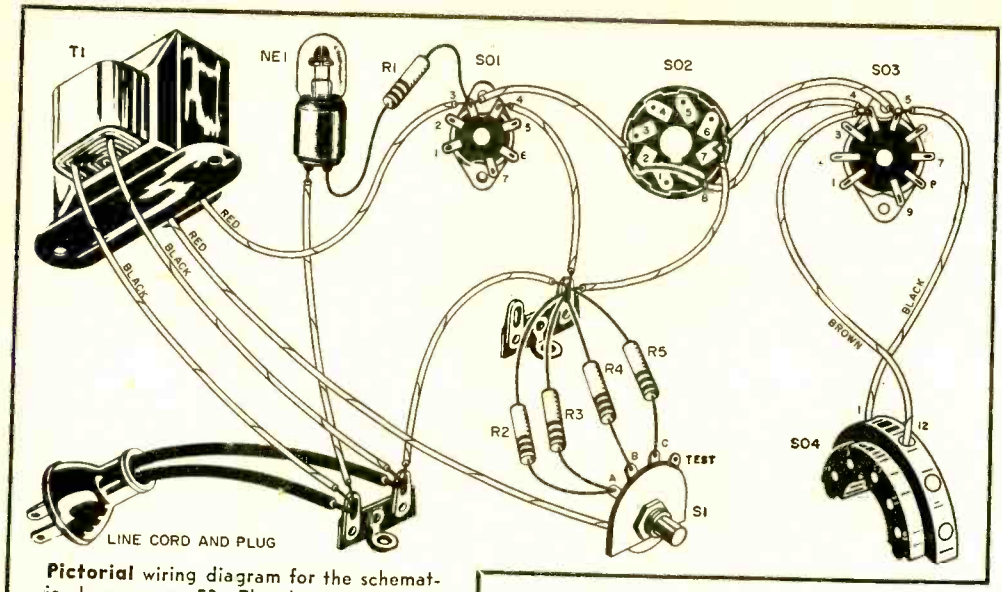


Pictorial wiring diagram for the schematic shown on p. 53. The three extra leads on TV tube socket SO4 are clipped off.

tacle and replace the regular picture tube socket with the socket from the Rejuv-a-chek. After the treatment, replace the regular tube socket, insert the TV set power plug, and check the received picture for increased brilliance and better contrast.

The Rejuv-a-chek is designed for use with tubes containing 6.3-volt heaters requiring 0.15 amp. (switch position *C*), 0.3 amp. (switch position *B*), or 0.6 amp. (switch position *A*). Consult a tube manual for heater current data before plugging in an unfamiliar tube.*

You can check the continuity of components with the Rejuv-a-chek by means of a pair of test leads plugged into socket holes 2 and 7 of the octal socket. Be careful not to touch the bare tips of the prods together or touch them to a grounded object, because one of the two test prods is connected directly to the 117-volt power line.

Although the Rejuv-a-chek will not rejuvenate every weak tube plugged into it, its batting average is surprisingly high. Try it and see. —30—

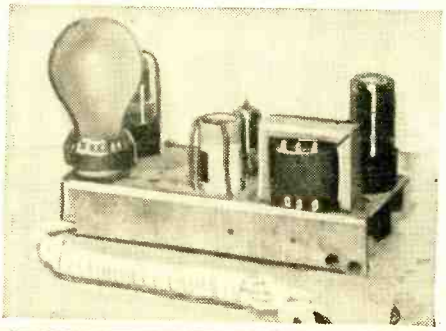
* More sockets may be included to accommodate additional tubes if their terminals are connected in parallel with those of the present sockets. For example, another 9-pin socket, with pins 4 and 5 strapped together as one heater terminal and pin 9 as the other heater terminal, will accommodate most of the 6.3/12.6-volt, 9-pin tubes such as the 12AU7, 12AT7, etc.

To calculate the values of dropping resistors for tubes with different voltage and current requirements, multiply the rated voltage by 1.35. Subtract the product from 12.6 volts. Then divide this answer (4 volts for 6.3-volt tubes) by the rated heater current in amperes. The result will be the required resistance in ohms. Multiply the voltage drop by the current to obtain the required wattage rating. Use the next larger wattage resistor.

Bulbs for Series Heaters

Every now and then an unusual value of heater dropping resistor would solve a voltage problem. Most experimenters forget that the ordinary lamp bulb can be used. I built a phono-amplifier (shown in the photo) using a 40-watt household bulb in series with a 12AU7, 50L6 and 35Z5; this provided the correct heater voltage drop and has been in use for several months. Another circuit that I put together using a lamp bulb employed a pair of 25L6 tubes, in parallel, fed from a single 6SN7 tube; the heater voltage here was obtained from a 100-watt bulb.

Experimenters can easily duplicate these experiments using other tubes and bulbs if they follow a rule-of-thumb approach. You cannot calculate the resistance of the lamp in advance since the values change with the amount of current flowing. Start with 6- or 10-watt bulbs and work up to the desired filament drop. —*Don L. Roberts*



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